National Aeronautics and Space Administration

HUMAN HEALTH AND PERFORMANCE

Exploring Space | Enhancing Life

Biomedical Laboratories

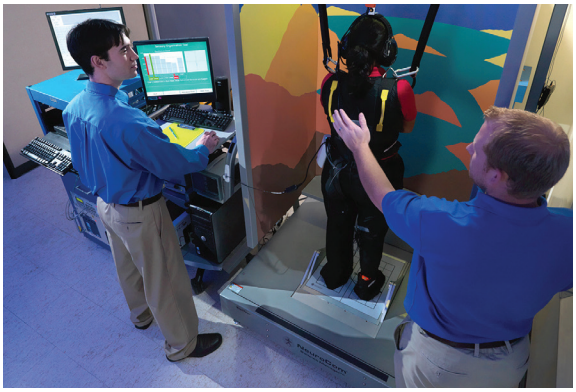
Understanding the Physiological Response of Humans to Extreme Environments

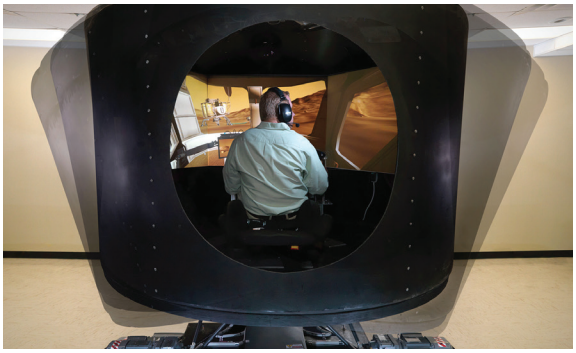
Our unique collection of science laboratories conducts applied research as well as provides clinical testing and biomedical research expertise. Scientists and physicians conduct biomedical research in-flight on ISS as well as in spaceflight analog environments to better characterize the effects of living and working in space on human physiology and to evaluate the candidate countermeasures.

World Renowned Skills and Unique Capabilities

The Johnson Space Center, a world leader in human spaceflight, possesses unique knowledge, skills, and capabilities that can be applied to solving human health and performance challenges here on earth—particularly those related to operating in extreme and harsh environments.

NASA collaboration expertise is available in the areas of biomedical research and engineering solutions, biostatistics, cardiovascular and exercise physiology, microbiology, neuroscience, nutrition, immunology, bone and mineral research, behavioral health, and pharmacotherapeutics. Research capabilities include numerous unique space environmental laboratory facilities.





Johnson Space Center

The enclosed JSC unique Biomedical Laboratory capabilities expertise, skills, knowledge and capabilities are available to be used to support development of advanced biomedical systems that could be used for terrestrial applications; Army and Navy uses and operations; to aid in development of new biomedical capabilities for Commercial Crew; new space mission endeavors such as an orbiting commercial venture and space tourism; extreme environments terrestrial operational challenges of working and living in extreme and harsh environments; medical research and development; and optimizing for human health and performance.

Microbiology Expertise and Lab

JSC has the unique highly skilled interdisciplinary team serves as a NASA-wide resource for microbial issues associated with living and working in extreme closed environments operations; requirements development; environmental monitoring (including enumeration, microbial characterization and identification); potable water analysis; crew diagnostics; food analysis; crew training; bio-safety review of payloads; and hardware and technology development. The Microbiology Lab has the capability for microbial research issues associated with living and working in extreme closed environments through operational monitoring and investigative research.

Biomedical Research and Operations Laboratories

This JSC unique collection of sciences laboratories conducts applied research as well as provides clinical testing and biomedical research expertise. Scientists and physicians conduct biomedical research in-flight on ISS as well as in spaceflight analog environments to better characterize the effects of living and working in space on human physiology and to evaluate the candidate countermeasures.

Neuroscience

JSC has unique Neurosciences laboratories capabilities to perform human subject data collection and analyses for ground-based and flight studies pertaining to functional neurological assessments that provide an objective test of neurosensory re-adaptation to Earth's normal gravity following prolonged weightlessness.

Nutritional Biochemistry

JSC has a unique Nutritional Biochemistry Laboratory that has the ability to perform nutritional assessment techniques, including analyses of blood and urine samples for biochemical endocrine, and other physiological markers, in addition to detailed dietary intake assessment.

Immunology

JSC has unique skills, expertise, knowledge, and facilities to investigate and recommend countermeasures for the effects of extreme environments on human physiology including effects on the human immune system and on kidney stone formation.

Pharmacotherapeutics

JSC has a unique Pharmacotherapeutics Laboratory capability to perform clinical pharmacology research and operations, conduct therapeutic drug monitoring, perform pharmaceutical stability assessments, maintain therapeutic database analysis and maintenance, and provide pharmacy information services and documentation.

Extra-Vehicular Activity (EVA) Physiology

JSC has a unique EVA Physiology Laboratory capability and expertise in prebreathe exercise prescriptions, ability to analyze and graphically present metabolic data rates for use by mission flight surgeons during EVAs, and ability to support hypobaric testing and simulations.

Cardiovascular Physiology

JSC has a unique Cardiovascular Laboratory capability and expertise to identify risks associated with spaceflight, conduct cardiovascular research using state of the art technologies and methods including Echocardiography, Vascular Imaging, Holter Monitoring, Orthostatic Tolerance measures, muscle volume testing, time series data analysis, and virtual guidance ultrasound.

Core Analytical Lab

JSC has a unique Core Analytical Laboratory capability equipped to provide enhanced cellular and physiologic analytical research and analysis.

Behavioral Health Research

JSC has unique Behavioral Health expertise and research environments that are used simulate extreme environmental conditions such as altered day and night cycles, heavy workloads, social isolation, and close living quarters that provide insight into the impact of these conditions on human behavior and performance.

Exercise Physiology

JSC has unique expertise and facilities to support fitness-related crew medical testing, evaluate and validate exercise countermeasures hardware, protocols, and conditioning programs for human health and performance maintenance, complete biomechanical assessments of crew during exercise, and generate and use modeling tools to improve exercise countermeasures.

For the benefit of all

For more information:
NASA Human Health and Performance Center at
http://NHHPC.nasa.gov or go to:
http://www.nasa.gov/centers/johnson/slsd/

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